

Dryers [Farm machines]

Features of dryers

To preserve certain kinds of grain some forming machines use dryers.

Usually, the capacity range is up to 3.7kW.

There are many kinds of dryers.

Ex.

- Circulation type
 - Stir type
 - Infrared lay type
- etc.

Some garbage disposal machines also use dryers to decrease weight and volume of the waste.

Merits of inverter drives

Dryers with inverters have the following merits:

- Freely sending speed

The drying time can be decided the sending speed.

- Constant temperature control by temperature sensors

In the stock type dryers, the internal temperature can be kept constantly.

Notices regarding the use of inverter drives

- Motor capacity at high speed

Usually, you can't increase motor speed beyond its rated speed.

Ex. Change of speed to 110% will result in a load torque $110\% \times 110\% = 121\%$.

This load torque will overload the motor or inverter. In this case, you have to increase the motor and inverter capacity.

- Motor rating

The capacity range of the "dryers" is small. Sometimes, there is a 100V motor rating. In this case, please change the motor from 100V rating to 3 phase, 200V rating.

(The inverter is designed for 3 phase 200V or 400V motor.)

If you have only a single phase 100V power supply, please select the VF-nC3 series that has a line-up for single phase 100V input / 3 phase 200V output.

Point

- VFNC3S-1001P (0.1kW)
- VFNC3S-1002P (0.2kW)
- VFNC3S-1004P (0.4kW)
- VFNC3S-1007P (0.75kW)

- Electromagnetic noise

The inverter is generating "electromagnetic noise".

If there are some high accuracy sensors or other sensitive equipment near the inverter drive, the inverter's noise may cause some trouble or a malfunction.

Electromagnetic noise can be avoided by installing an external noise filter or using a different wiring method.

- Harmonics

The inverter is generating "harmonics".

These harmonics sometimes cause a malfunction in other control equipment that is connected to the same power source.

Harmonics can be avoided by installing an external "reactor".

To decrease "harmonics", we recommend to install DC reactors in all our inverter models. (NOTE: 100V input models require AC reactors.)

Selection

In almost all cases, the capacity of the inverter is the same as the motor capacity.

However if you have a fixed acceleration/deceleration time, the inverter capacity should be larger than the motor capacity.

Please confirm your motor's rated current.

$[\text{Motor's rated current}] \times 1.05 < [\text{Inverter's rated current}]$



When you connect several motors to one inverter, please confirm the following:

$[\text{Total motor's rated current}] \times 1.1 < [\text{Inverter's rated current}]$

In this case, the electric thermal function in the inverter can't protect all motors. Please install an external thermal relay for each motor.

Application samples

In case of dryers (used with fans, screw conveyers and bucket conveyers), each motor can be controlled by the inverter using the following methods:

- The internal temperature and humidity are controlled by the fans.
- The conveyer speed depends on the volume of conveyance.

In almost all cases, there are two or more frequency controllers in the dryer.

Examples of external controller use:

- Synchronous run and stop operation
- Analog signal input for conveyers
- Analog signal input for fans
- The temperature sensor signal input
- Emergency stop when an abnormal temperature or an abnormal speed occurs.

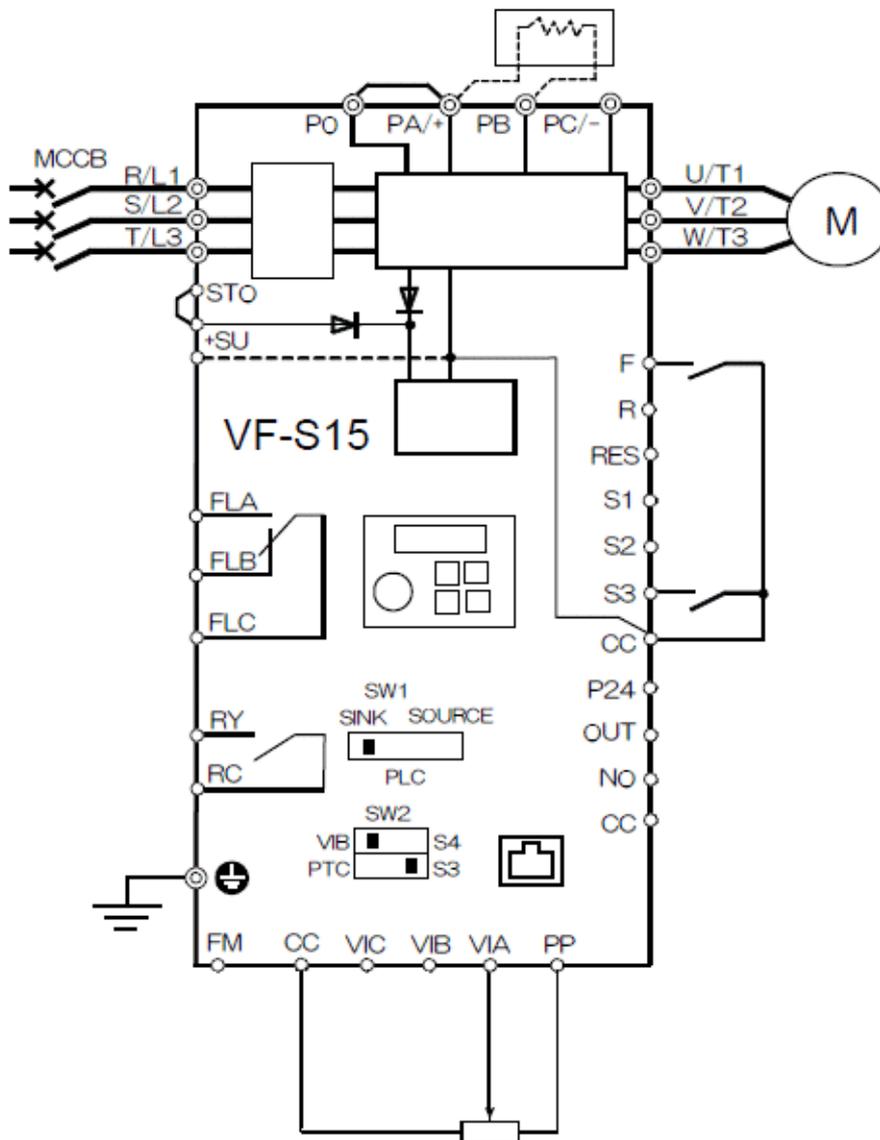
Connection diagram of inverters to bucket conveyers (VF-S15)

Bucket conveyers have motors with mechanical brakes.

In this case, the low speed detection signal (RY and RC terminals) can be used as the releasing signal of the brake.

In addition, the following functions are installed:

- Emergency stop signal
- Braking resistor installation



Setting table for inverters for bucket conveyers (VF-S15)

Title	Function	Setting range	Recommended setting
<i>Cn0d</i>	Command mode selection	0: Remote, 1: Local, etc.	0
<i>Fn0d</i>	Frequency setting mode selection	0: Built-in potentiometer, 1: VIA, 2: VIB, etc.	1
<i>ACC</i>	Acceleration time 1	0.0 ~ 3600	Depends on the system
<i>dEC</i>	Deceleration time 1	0.0 ~ 3600	Depends on the system
<i>F100</i>	Low speed signal output frequency	0 ~ Maximum frequency [FH]	2
<i>F116</i>	Input terminal selection 6 (S3)	0 ~ 203	20
<i>F304</i>	Dynamic braking selection	0: Disabled, 1: Enabled, etc.	1